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## ORIGINAL ARTICLES

### ETHYLENE-OXYGEN ANESTHESIA*

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When the Hull Botanical Laboratory, fifteen years ago, determined that the toxicity of illuminating gas for flowering plants was due not so much to its carbon monoxid content as to the ethylene which forms about four per cent of the gas, this fact naturally suggested the study of its toxicity for animals. Preliminary experiments were made by A. B. Luckhardt and J. B. Carter, of Chicago, with frogs, white mice and one dog. In the concentrations used (diluted with oxygen) it was found that ethylene was not only relatively nontoxic but also seemed to possess both analgesic and anesthetic properties. Further experiments were made with frogs, white mice, white rats, guinea pigs, rabbits, cats and dogs, using different concentrations of ethylene. Control experiments were made at the same time with other gases, namely, hydrogen, nitrogen and nitrous oxid. The observers found that hydrogen and nitrogen did not anesthetise at all and that ethylene not only anesthetised in about half the time required for nitrous oxid, but that it anesthetised in lower percentage mixtures.

Following these preliminary investigations, Luckhardt and Carter tried the gas on each other and on volunteers for the work until they had anesthetised more or less deeply twelve subjects, finding that surgical anesthesia could be rapidly induced without any sense of asphyxia, but rather with a sense of wellbeing, the anesthesia being characterized by good color, muscular relaxation, slow pulse and respiration and rapid recovery on withdrawing the gas mixture. After these experiments on normal, healthy individuals, the administration of ethylene was extended to patients requiring surgical intervention, first for the more simple procedures, and on being found satisfactory, gradually in the more prolonged and major operations, until at the present time it is used extensively in varoius hospitals by many surgeons and anesthetists.

*Read before the Fifty-first Annual Meeting of the Florida Medical Association, held at Orlando, May 13, 14, 1924.

Ethylene is an unsaturated hydrocarbon, prepared by allowing very small amounts of ethyl alcohol to interact slowly with very hot sulphuric or orthophosphoric acid. As a result of this interaction ethyl alcohol loses one molecule of water:

$C_2H_5OH$ -|- heated $H_3PO_4$ — $C_2H_4$ (ethylene) -|- $H_2O$.

Chemically then ethylene may be considered a dehydrated ethyl alcohol. Ethylene is an inflammable gas and forms with air or oxygen in certain concentrations an explosive mixture. The gas may now be bought compressed in cylinders ready for use in the same way that nitrous oxid and oxygen are supplied.

At the Duval County Hospital, in Jacksonville, we have, so far, used ethylene-oxygen anesthesia in some sixty cases with great satisfaction. It is administered in practically the same manner as nitrous oxid anesthesia. Any gas machine may be used for ethylene, care being taken not to attach the ethylene cylinders to the oxygen side of the machine. The administration is begun with about ten per cent oxygen from the beginning, or possibly a few breaths first of the pure gas in the more robust subjects. After surgical anesthesia has been established the oxygen can be increased to twenty per cent or more without disturbing the anesthetic level, which, of course, is a much higher percentage of oxygen than can be used routinely with nitrous oxid—the average with nitrous oxid being about five to ten per cent.

In this preliminary survey of fifty cases, it is our experience that this anesthetic offers the following advantages:

1. *Ease of induction and rapidity of recovery.* Very few patients require any restraint, the induction being characterized by lack of movement or excitement, quiet pulse and respiration. It is found that patients are ready for operation in a surprisingly short time, many of the patients for laparotomy being ready for incision in seven to eight minutes. As with other anesthetic agents, however, it will be found that anesthesia and relaxation are better if the ethylene-oxygen is allowed at least ten minutes to secure the desired level of surgical narcosis. Minor surgical procedures may be started much sooner, *e. g.*, a tooth

may be extracted or an abscess opened after about two minutes of anesthesia.

If the induction has been surprisingly quick, the recovery usually is equally prompt. The recovery from ethylene is very slightly slower than from nitrous oxid, this being more noticeable in those patients who have had a preliminary hypodermic. But in no patient was this recovery period longer than five minutes, even in those under the anesthetic for two hours or more. The average time of recovery was about three minutes.

2. *Relaxation without cyanosis.* At no time are the patients cyanotic under this gas if the airway is kept clear, and this is easily done, for the jaw is very relaxed and the chin can readily be held forward or an artificial airway introduced. You will find that the mucus membranes, skin and viscera are a healthy pink color due to the high percentage of oxygen which can be given with ethylene. This is in strong contrast to nitrous oxid anesthesia, in the administration of which cyanosis is often present, if the gas is given in a concentration sufficient to secure the desired plane of surgical narcosis.

3. *The maintenance of this anesthesia also shows quiet respiration and a pulse of normal rate or slightly slowed.* The whole picture resembles a chloroform narcosis with its quiet respiration and slow full pulse. The patient's skin remains warm and dry; it is usually unnecessary to change the patient's garments on returning to bed. The only patients, in the present series, showing rapid pulse and respiration and sweating were those septic cases which came to the table with elevation of temperature, pulse and respiration. This type of patient always sweats and runs a rapid pulse and has a rapid shallow respiration under any anesthetic.

4. *Absence of respiratory irritation.* It has been our experience that ethylene causes no irritation of the respiratory tract, consequently no mucus is secreted. This is a distinct advantage in all patients, but especially in those with disease of the respiratory tract contraindicating ether. So far we have noted an absence of kidney irritation, ethylene-oxygen having been used in nephritis and diabetics without any exacerbation of the condition.

5. *The analgesia seems both more pronounced and prolonged than with nitrous oxid.* It is possible to begin minor operations in about two minutes; or after induction to remove the mask and pull one or more teeth, even though the patient is beginning to regain consciousness. This increased analgesia is one of the reasons for the success of ethylene, for it permits more manipulation with less muscular reaction.

6. *One of the most important advantages of ethylene anesthesia seems to be the slight effect on blood pressure.* In this series there were not many blood pressure records kept, because both hands and attention seemed to be fully occupied with the handling of a new method. But all those who have kept such records seem to be in accord in reporting that there is a small initial drop in blood pressure and pulse rate, after which both fluctuate very little, even with fairly rough handling of the tissues. It is hardly probable that any anesthetic, however, will protect from traumatic shock in the presence of manipulations that are rough or unduly prolonged. Dr. E. I. McKesson, of Toledo, Ohio, who is probably the best known authority on blood pressure guides during anesthesia, has recently made the statement that after using ethylene for nine months he has never seen a real case of shock during its use.

7. *Premedication.* With this anesthetic patients may be handled without premedication. Better relaxation is more certain for laparotomy, however, with the use of morphin, morphin-atropin or morphin-scopolomin, as the case may be. This is best given one hour before operation.

8. *Lessened postoperative vomiting.* Figures on vomiting following anesthesia are hard to obtain, various writers often giving widely different percentages; this is possibly from the fact that the cause of post-anesthetic vomiting is often difficult to determine. Without doubt many patients vomit after anesthesia from the effects of the anesthetic itself, but some vomit also from morphin susceptibility and some from the handling of reactive viscera. In the present series, there have been ten that vomited. This does not refer to those patients who have retched and perhaps spit up a small amount of fluid immediately on withdrawal of the gas mixture. It refers rather to those in whom some nausea has persisted for a number of hours and who have vomited two or three times or oftener. This would give us a percentage of 16.7 who have vomited. There have been three of these patients who have vomited like the average ether patient. Sixty cases is too small a number from which to draw hard and fast conclusions, but when we remember that about seventy-five per cent of ether patients vomit, it is certain that ethylene

offers a marked reduction not only in the number of cases, but also in the degree of nausea.

DISADVANTAGES

1. *Odor.* Ethylene has a peculiar odor that is most often likened to molasses, a combination of fermenting sorghum and wet matches. Objections to this odor seem most often to come from the operating room personnel rather than from the patient. Our patients have seldom objected to the odor, in fact some of those, who previously have been anesthetised with nitrous oxid, say they prefer "the new gas because they went to sleep so much quicker." The odor is a minor disadvantage.

2. *With ethylene, as with any gas anesthetic, there is a much narrower margin of anesthesia than with ether.* This might be classed as a disadvantage to the surgeon and anesthetist, but certainly from the patient's viewpoint it is an advantage. This narrow margin of anesthesia necessitates an administrator trained in gas anesthesia, for your patient may very quickly be too light or too deep. Changes may occur so quickly that good anesthesia and the safety of the patient demand "eternal vigilance."

3. *The real disadvantage of ethylene lies in the fact that it is an inflammable gas and that in certain combinations of air or oxygen it is highly explosive.* Therefore, it must not be used in the presence of a cautery or free flame. Dr. W. Easson Brown, of Toronto, a pioneer in the use of this gas, shows that ethylene can be safely compressed into cylinders for handling and shipment. He has proven that pure ethylene without oxygen or air will not explode in the presence of an electric spark, but the real danger arises when oxygen is added for anesthesia. In the usual percentages in which ethylene-oxygen is used for anesthesia, up to twenty-five to thirty per cent oxygen, the mixture is not an explosive one. The ethylene must be mixed with thirty-five to forty per cent oxygen before it will explode in the presence of an electric spark, according to Dr. Brown. The higher the percentage of oxygen, the more explosive the mixture, the maximum violence being reached with about three parts of oxygen and one of ethylene.

Another danger that must be considered is the ethylene that escapes from the spill valve of the mask into the room and becomes explosive when the ethylene content of the air reaches five per cent. Supposing that the normal ventilation of a patient is 8000 cc. a minute and the average operating room contains 2700 cu. ft. (15x15x12), it would require at least six hours' continuous anesthesia without the slightest room ventilation to bring the ethylene content of the atmosphere up to five per cent, which is the minimum explosive mixture. In view of the fact that two fatal and some less distressing explosions have already occurred, it behooves us at present to exercise every precaution and under no circumstances use ethylene-oxygen anesthesia in the presence of the cautery, free flame or electric spark.

ILLUSTRATIVE CASE REPORTS

The present series has included a variety of cases. It has been used for both white and colored. The ages have ranged from four to seventy years. The ethylene-oxygen was first used for the induction of ether anesthesia, and then for cystotomy, external urethrotomy, amputations, pelvic laparotomy (salpingectomy, hysterectomy), appendectomy, cesarian section and gastro-enterostomy. In practically all cases so far ether relaxation has been attained or very closely approached. With a few exceptions our patients have had premedication, usually morphin gr. 1/6, atrophin gr. 1/150; a few have had morphin and scopolomin, but the scopolomin seems to be unnecessary, as morphin in moderate doses is all that is required. From the cases studied the following have been selected as illustrations:

Case 1. I. C., colored female, age 45, admitted to the County Hospital March 21, 1924, with a fibroid tumor in left broad ligament. March 24, 1924, under ethylene-oxygen anesthesia the abdomen was opened, the tumor removed and a supravaginal hysterectomy and double salpingo-oöphorectomy done. The operative time was one hour. The anesthesia was good throughout, with relaxation at all times. The patient's postoperative condition was good, being fully awake from the anesthetic in three minutes, with the skin warm and dry, vomited a small amount of clear fluid on withdrawal of the anesthetic; no further vomiting. Convalescence uneventful.

Case 2. C. P., colored female, age 22 years, admitted to the County Hospital March 21, 1924. Diagnosis: Double pus tubes and cystic disease of both ovaries. March 27, 1924, under ethylene-oxygen anesthesia, a double salpingo-oöphorectomy was done, leaving a portion of left ovary. The anesthesia was good through the operation, the relaxation being good at all times. Three

minutes after withdrawing the anesthetic, the patient was awake and mentally clear, the skin warm and dry, no nausea or vomiting.

Case 3. L. J., colored female, age 33 years, admitted County Hospital March 8, 1924. Diagnosis: Fibroid uterus, double pus tubes. March 18, 1924, under ethylene-oxygen, supravaginal hysterectomy, removal of both tubes and a cystic right ovary and appendectomy were done. Anesthesia and relaxation were good at all times. Postoperative condition was good, patient being awake in three minutes, skin warm and dry and vomited a small amount of clear fluid. This patient complained of slight nausea during the remainder of the day and vomited a small amount of clear fluid three times.

Case 4. M. W., white female, age 35 years, admitted County Hospital January 22, 1924. Diagnosis: Cholecystitis and cholangitis. January 30, 1924, under ethylene-oxygen anesthesia, a Finney pyloroplasty and drainage of the gall bladder were done. The operative time was two hours and ten minutes. Although the operation was in the upper abdomen, the relaxation was good throughout. Postoperative condition was good, the patient reacting from the anesthetic in five minutes, nails and lips pink, somewhat drowsy. There was no nausea or vomiting.

Case 5. W. H., white boy, age 16 years, admitted County Hospital February 9, 1924. Diagnosis: Glaucoma left eye, with degeneration of the globe and corneal ulcer. On admission the patient had a bronchitis and was running moderate temperature. Ten days after admission, under ethylene-oxygen anesthesia, the eye was removed. Anesthesia was entirely satisfactory; skin remained warm, dry and pink, pulse and respiration slow. On withdrawal of the gas mixture, the patient was awake and mentally clear in two minutes. There was no nausea or vomiting.

Case 6. R. D., colored male, age 19 years, admitted March 25, 1924. Diagnosis: Double inguinal adenitis (the glands not broken down). March 27, 1924, under ethylene-oxygen, there was done a double inguineal adenactomy and circumcision. The anesthesia was exceptionally good, patient being quiet and relaxed at all times, with slow, quiet respiration and normal pulse rate. Postoperatively, patient awake and mentally clear in two minutes, no nausea or vomiting.

Case 7. B. W., colored male, age 40 years, admitted March 21, 1924. Diagnosis: Periurethral abscess, urinary fistula and strictures. March 24, 1924, under ethylene-oxygen anesthesia, external urethrotomy was done. Anesthesia was entirely satisfactory throughout. Postoperatively, patient was awake in three minutes, skin warm and dry, no nausea or vomiting.

Case 8. W. K., colored male, age 46 years, admitted to the County Hospital. Diagnosis: Periurethral abscess. April 11, 1924, under ethylene-oxygen, a periurethral and ischiorectal abscess were opened and drained. Anesthesia was entirely satisfactory. Patient was quiet and relaxed at all times. Postoperatively, awake in five minutes, skin warm and dry, no nausea or vomiting.

Case 9. R. S., colored female, age 45 years, admitted to County Hospital October 19, 1923. Diagnosis: Pedunculated fibroids of the uterus. The tumor mass filled the entire lower abdomen, extending one inch above the umbilicus. In addition, there was a marked enlargement of the heart to the left, with a loud systolic murmur which was transmitted to the axilla and to the vessels of the neck. The urine on repeated examination showed albumen. The hemoglobin was only 20 per cent. Due to these findings, the patient was kept under treatment until the hemoglobin had been brought up to 55 per cent. February 20, 1924, under ethylene-oxygen anesthesia, operation revealed a fibroid of the uterus and a very large left ovarian cyst. The cyst was removed, and hysterectomy done, with removal of both tubes and ovaries. Operative time, one hour. Anesthesia was satisfactory throughout, relaxation good; the latter was very necessary in this case on account of the large tumor mass. Postoperatively, the patient's condition seemed little changed from that prior to operation; awake and mentally clear in five minutes, warm and dry, no nausea or vomiting.

Case 10. C. T., white female, age 15 years, admitted to St. Vincent's Hospital. Diagnosis: Tuberculosis of left kidney. May 3, 1924, under ethylene-oxygen anesthesia, nephrectomy was done. The anesthesia was unusually good, the patient being relaxed throughout the operation as well as though ether had been used. Color was pink. Respiration was quiet and slow. The pulse continued at about the normal rate. On withdrawing the anesthetic, patient had reacted in three minutes. Retched, but there was no vomiting. The skin was warm and dry.

### FAILURES

In this series there have been five more or less complete failures. As failures often are more

instructive than the cases that go according to rule, they are briefly summarized:

Case 11. C. W., a young colored man, was anesthetised with ethylene for a posterior gastro-enterostomy. The anesthesia was quiet and seemed good, but the patient was not sufficiently relaxed for the surgeon to work properly, so that ether was added while the viscera were being handled preparatory to doing the anastamosis and again for closure of the peritoneum. The patient's recovery from the anesthetic was somewhat delayed. Otherwise he made a good recovery following the operation. There are patients for upper abdominal surgery who require profound anesthesia to entirely abolish all reflex rigidity. It is my opinion that this patient was one of that class, for there was sufficient time taken to relax him before the incision was made and the tissues were not handled unduly.

Cases 12 and 13. S. H. and L. W., two colored women, were anesthetised with ethylene for pelvic laparotomy. The relaxation was so unsatisfactory that they were both given ether; the relaxation under ether was not strikingly good. They both proved later to be alcoholics, and alcoholics prove resistant to any anesthetic agent. It is my opinion that the unsuccessful outcome of the first of these two cases was also partly due to too early incision and unnecessarily rough traction on the abdominal muscles.

Case 14. H. C., a white man, was a complete failure under ethylene. The operation was appendectomy and drainage of the gall bladder, with a long right rectus incision. The relaxation with ether was not good at any stage of the operation. This patient proved to be an alcoholic, with sclerotic vessels and cirrhotic liver, which is probably sufficient reason to explain our failure here.

Case 15. J. J. W., white, was anesthetised with ethylene for amputation of the cervix and pelvic laparotomy. This patient had had previous anesthetics and was very apprehensive about being "smothered." However, the anesthesia and relaxation were good for the vaginal work and the first part of the laparotomy, when the ethylene supply became exhausted; a change was made to nitrous oxid-oxygen, which did not give sufficiently deep anesthesia, so that ether was added until the completion of the operation. This patient commented voluntarily on the pleasant anesthesia that had caused no sense of suffocation. It is my opinion that this case would have been entirely satisfactory, except for the exhaustion of the gas supply.

## CONCLUSIONS

It seems, then, in brief, that we have a new anesthetic occupying a place between nitrous oxid and ether, being superior to the former in some respects and very closely approaching the latter without its disadvantages; an agent with which anesthesia may be rapidly and pleasantly induced, and maintained with respiratory and circulatory functions at approximately their normal rates, with no syanosis, no sweating and no irritation of the lungs or kidneys; and very little postoperative nausea or vomiting.

We have a new gas which is making a definite place for itself as a general anesthetic and is deserving of serious consideration, further laboratory work and a very thorough clinical trial.

## REFERENCES

1. Luckhardt & Carter—Physiological Effects of Ethylene, J. A. M. A., Vol. 80, pp. 765-770, March 17, 1923.
2. Luckhardt & Carter—Ethylene as a Gas Anesthetic. Researches in Anesthesia and Analgesia, Vol. II, No. 6. Dec., 1923.
3. Brown, W. E.—Preliminary Report on Experiments with Ethylene as a General Anesthetic, Ibid, Vol. 2, No. 3. June, 1923.
4. Herb, Isabella, M. D.—Ethylene: Notes Taken from the Clinical Records. Ibid, Vol. II, No. 6. Dec., 1923.
5. Gwathmey, Jas. T.—Laboratory and Clinical Experiments with Ethylene and Other Hydrocarbon Gases. British Journal of Anesthesia, Vol. I, No. 3. Jan., 1924.
6. Brown, W. E.—Ethylene as a General Anesthetic. Am. Journal of Surgery, Anesthesia Supplement, Vol. XXXVIII, No. 1. Jan., 1924.
7. McKesson, E. I.—Ethylene-Oxygen (the new anesthetic). Reprint from the Toledo Technical Appliance Co. Feb. 1, 1924.
8. Papin & Ambard—Anesthesia by Ethylene. Presse Medicale, Feb. 13, 1924, p. 133.
9. Brown, W. E.—Explosibility of Ethylene Mixtures, J. A. M. A., Vol. 82, No. 13, pp. 1039-1040.
10. Luckhardt & Lewis—Clinical Experiences with Ethylene-Oxygen Anesthesia, J. A. M. A., Vol. 81, No. 22, Dec., 1923.
11. Lundy, John S.—Ethylene-Oxygen as an Anesthetic for Infants, J. A. M. A., Vol. 82, No. 6, Feb., 1924.
12. Leake & Hertzman—Blood Reaction in Ethylene and Nitrous Oxid Anesthesia, J. A. M. A., Vol. 82, No. 15, April, 1924.
13. Christiansen, John F.—Clinical Experiences with Ethylene-Oxygen Anesthesia in Dentistry. Dental Cosmos, Vol. 66, No. 3. March, 1924.

## DISCUSSION

*Dr. J. E. Boyd, Jacksonville:*

Gentlemen, I am not an anesthetist, but I want to say that you have listened to an expert. I have had the pleasure of seeing some of these ethylene anesthetics of his not only in my own private work but in the general work at the Duval County Hospital, where most of this work has been done.

Two, at least, of these failures which he reports were on my personal patients. They were

both upper abdominal cases, and I want to emphasize the fact that neither one of these two cases did well even under an ether anesthetic. I do not believe that there can be any qustion as to why a patient does not do well under a gas anesthetic when the same patient also refuses to do well under ether. I believe that all doctors who have had a great deal of experience in surgery will agree with me that there is a certain definite type of patient that does well under no type of anesthetic.

I note that Dr. Day has failed to report one case, which I would like to emphasize at this time, which shows that he has at least done one ethylene-oxygen anesthetic in the case of a nephrectomy, and this case has proved a great eye-opener to myself. The patient reacted without practically any shock at all, the postoperative nausea has been minimum, and the case has been highly satisfactory. Now, anybody that has done much kidney work knows that ether is hard on these cases—ether or chloroform, either one. When I was up in Boston the men up there were doing most of this kidney work under gas-oxygen. From my observation of the gas-oxygen as compared to this one case, which means nothing, just one case—but one case is one case—I am very much in favor of the ethylene-gas because ethylene anesthesia is just a little bit deeper than that with gas, the relaxation is just a little bit better, the recovery is just as rapid, and the postoperative nausea and vomiting appears to be practically, as far as my observation goes, the same.

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## TRAUMA OF THE FEMALE PELVIC ORGANS*

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It is the purpose of this paper to discuss diagnosis and differentiation of trauma from other pathological conditions, and the prognosis of such trauma, rather than to discuss the means of treatment, which may be referred to only incidentally. Neither are we considering those injuries which are due to direct violence, such as punctures and contusions, since they have to be considered under general surgery dealing with such injuries in a more general way; but it is our intention to consider those injuries which are the result of some sudden blow, or jar, or strain, or fall of the whole, or some part of the body whereby the uterus, or its appendages may be secondarily injured. This would reduce the discussion to that of malpositions and the resulting manifestations, to hemorrhage and to accidents incident to pregnancy.

To reach a better knowledge of pathological conditions, it is well, first, to understand the normal anatomy and physiology of the organs under discussion. The organs which we have in mind for discussion are the uterus and its appendages. It will be remembered that the nerves of the uterus are from the sacral plexus of the spinal nerves, and that its sympathetic nerves are from the hypogastric plexus which is directly connected with the great solar plexus of the sympathetic system, making a direct and intimate sympathetic relation between the pathologic conditions of the pelvic organs and those of the abdominal cavity, a matter that sometimes confuses the most learned and best drilled expert in making a diagnosis. The arteries of the uterus are from the abdominal aorta and the internal iliac arteries, and the veins are similar in arrangement. These nerves, arteries and veins enter the uterus laterally through the broad ligaments, a fact not to be overlooked in misplacements of the uterus. The lymphatics of the body of the uterus terminate in the lumbar glands, while those of the cervix terminate in the pelvic glands, a knowledge of which enables us to better determine whether a condition be traumatic, infective, or cancerous. The uterus is suspended about the center of the pelvis very loosely to permit of its evolution and enlargement through pregnancy and its involution following delivery. The legamentous and areolar attachments of this organ are such as to permit the fundus to change its position ten or twelve inches vertically during pregnancy. It is easy to understand that this organ varies its position anteroposteriorly to accommodate itself to a full bladder and an empty rectum, or the reverse, these changes of position occurring several times daily, and its position may be said to be normal, whether lying forward against the symphysis pubis, being separate from these bones only by the thin walls of an empty bladder, or pushed back against the sacrum, being separated from that bone only by the walls of the rectum. It will be remembered, too, that the uterus is an organ that functions

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only through a certain period of life, and that, prior to that period and following that period of life, it is much smaller than it is during the functioning period. After the menopause, the termination of the functioning period of the uterus, it atrophies, becomes paler, and, if in normal health, is much less susceptible to injury. At birth the uterus is above the brim of the pelvis, but it soon settles down into the pelvic cavity, its normal place except during pregnancy. Laterally, the uterus may be normally nearer to one side than the other, though its usual position is about the center of the pelvis. Above, the uterus is covered with the peritoneum which forms the floor-lining of the abdominal cavity. The peritoneum covering the bladder dips down very slightly, forming a mere crease between the uterus and the bladder; but posteriorly, the peritoneum extends down the back of the uterus to the cervix and thence back up over the rectum, forming the pocket known as Douglas's cul de sac. This pocket makes more opportunity for posterior misplacement than anterior. The appendages of the uterus are the fallopian tubes, the ovaries and the round ligaments. One of each of these is attached to each cornu of the uterus and helps to hold the uterus in position.

The misplacements of the uterus are classed by the various gynecologists as ascent, descent, prolapse, antiflexion, antiversion, retroflexion, retroversion, right lateral misplacement, left lateral misplacement, torsion and inversion. Of all these misplacements, it is not conceded by any author, whom we have consulted, that any are ever due to traumatism except prolapse, retroversion and, possibly, in extraordinary cases, inversion.

Prolapse, as we all know, is uncommon except with women who have borne children. It is most often the result of injuries from childbirth, being due to the lack of support from below on account of unrepaired lacerations, lack of support above on account of relaxed ligaments, and increased weight of the uterus from subinvolution or from tumors in process of formation. There are, however, cases of prolapse due directly to traumatism in which none of the above play any part. These cases are due to extreme strain as in the act of lifting a very heavy weight. The Reference Handbook of Medical Sciences records a case of a young single woman who was making an extraordinary effort to hold up a stove and place a block under it at the same time, when she felt something give way in the pelvis, and her uterus came down so that the os projected beyond the vulva. Such a condition might result from a fall in which a person would land on the buttocks, knees, or feet. This condition need not result in permanent injury if properly treated at once, but such cases usually go neglected until the ligaments become permanently relaxed, adhesions result from inflammatory processes, and the uterus becomes fixed in the prolapsed state, resulting in permanent injury. Immediate adjustment in proper place and a few days' rest and quiet should result in permanent cure.

Inversion is an injury that can occur only under very few conditions. It can occur only when the lumen of the uterus has been very much increased from pregnancy or from some tumor in the lumen of that organ. The condition is not extremely uncommon in cases of abortion where the fetus comes away dragging the adherent placenta after it, and, while we have not known of such a case, it seems possible for such thing to occur when a fibroid tumor is passed off dragging the fundus of the uterus downward by a pedicle. Since either of these conditions might result from traumatism, the resulting inversion might be secondarily due to traumatism. Inversion may result from the mere act of standing on the feet immediately after delivery and has been known to occur when a recently delivered mother was over a vessel relieving her bladder and bowels. It is important in all these cases to completely reduce the inversion at once so that there may not remain a partial inversion to become fixed by adhesions and the general adjustment of the tissues. Any of these conditions could occur with a person traveling and be the basis for litigation.

Of all the traumatic conditions of the pelvic organs, retroversion ranks first. This is one of the obscure conditions that has given the disabilateer more days in bed than any other imaginary trouble. Owing to the paucity of known facts in connection with the genital organs of various individuals, it is easy for one to lead a jury to believe that a condition of long standing is of recent origin and made to date from some alleged injury. Certainly, no one except physicians know the position of the internal genital organs of any individual, and even the best gynecologists carry in mind only a few cases in which they can testify positively as to the position of the uterus at any given time. All these matters add to the difficulty of determining the cause and beginning of these conditions.

Age has much to do with trauma of the uterus

and, especially, with retroversion. It will be remembered that the uterus, before puberty, is small and that the cervix at this time is larger and longer than the body of that organ. With the large cervix and diminutive body, the tendency of the uterus would be to right itself even though it were retroverted, and we have not been able to find any record of a case of traumatic retroversion occurring before puberty, neither do we believe such thing possible in a normal girl. It is during the child-bearing period of a woman's life that retroversion is most liable to occur, and then it is that the symptoms are most pronounced when the accident does occur. As puberty approaches, the body of the uterus develops to its normal size, and then settles down into the true pelvis. The body now becomes heavier than the cervix, and, when the accident of retroversion does occur, the weight of the body tends to hold it in that position. There are many degrees of retroversion, and it has been found by some of the best gynecologists that forty per cent of women who have borne children have partially retroverted uteruses without any inconvenience, many of them not even knowing that the condition exists. Anything increasing the weight of the body of the uterus, as tumors, or early pregnancy, increases the tendency for retroversion. Traumatic retroversion may result from a fall, or sudden jarring of the body, such as landing on the buttocks. If the retroversion is slight, the uterus may adjust itself, but, if the retroversion is near complete, it remains so until it is relieved by manual adjustment. In complete retroversion the pain is intense from torsion of the broad ligaments and the resulting pressure on the nerves and blood vessels contained therein. Neglect of this condition may result in swelling and much tenderness of the uterus. One suffering from traumatic retroversion has difficulty in locomotion. Continued neglect of this condition may result in readjustment of the pelvic organs so that the condition cannot be relieved except with the greatest difficulty; but, if a person suffering from traumatic retroversion is given proper treatment at once, the condition may be easily and completely relieved. In a case of traumatic retroversion, the relief is immediate when the uterus is put back into place, and, if it is done immediately, the relief is usually permanent. Beginning with the menopause, the uterus atrophies. The blood vessels become diminished in size, and the uterus becomes paler instead of the pink appearance during its functioning period. It is now past its time to function, and it loses its high degree of sensation which it had during its functioning period. Its lumen decreases, sometimes disappearing entirely. It loses its rigidity and merely adjusts itself to whatever position it may find to allow the other pelvic organs to function. Malpositions are less liable to occur, and, when they do occur, the symptoms are less pronounced. In the atrophied state, retroversion is less liable to occur, and, when it does occur, the uterus may adjust itself. During the child-bearing period retroversion may result in hemorrhage, but this is less liable to occur after the menopause, unless the uterus is diseased. Certainly, a uterus hypertrophied from cancer, fibroids, or some inflammation might be readily retroverted, but this would be due to the pathological condition already existing as much as to any traumatism that could produce the immediate retroversion.

Diagnosis: There are many conditions that may retrovert the uterus. In fact, there are cases which are probably congenital. We are concerned here in determining which cases are traumatic and which cases are due to other causes. As we have said above, cases of slight retroversion from traumatism, usually adjust themselves and need not be considered. In the complete cases, or those near complete, the tortion of the broad ligaments with the included nerves and blood vessels, cause intense pain and interfere much with locomotion, while cases of longer standing have adjusted themselves so that these symptoms are less pronounced. While all cases manifest interference with the functions of the bladder and rectum, cases of more recent traumatism have the more marked symptoms. Hemorrhage may, or may not, be a symptom. In either case it is not usually profuse. The real diagnostic symptom lies in the result of treatment. If the uterus is recently retroverted from traumatism, it may be put back into its normal position where it remains without any special tendency to return to the retroverted position, and, immediately following the replacement, the pain and other disagreeable symptoms are relieved, and, in a few days, when the soreness and congestion abate, the patient becomes normal; while retroversion from other causes, being of longer standing, gives little relief by replacement, and the uterus returns to the abnormal position where it had remained before so long that it had become more or less adjusted to the malposition.

Prognosis: Any case of traumatic retroversion, uncomplicated, may be permanently relieved if properly treated immediately following the injury. If a case be neglected till the other organs of the pelvis have adjusted themselves to the malposition of the uterus, the case is less promising. In cases of pregnancy, miscarriage is the rule.

CASES REVIEWED

Case 1. Several years ago I was called to a Mrs. W., who had just had some kind of accident, the nature of which I have forgotten. Upon arriving, I found Mrs. W. lying in the bed, suffering intensely from pains in the pelvic region. The family were applying all the home remedies available without any relief. Upon examination, I found the uterus retroverted completely and somewhat enlarged. I learned from inquiry that she was about two months pregnant, which accounted for the enlargement. Putting her in the knee-chest position, I soon adjusted the uterus in its normal position, gave her a sedative and soon left her feeling comfortable. A few hours later I was called back to find her well progressed with an abortion. Later experience has confirmed my belief that abortion is the rule in such cases.

Case 2. A few years ago a lady came into my office one afternoon, suffering intensely from pelvic pain and soreness so severe that she could hardly walk. Upon examination, I found the uterus retroverted and so swollen and tender from having been a few days in that position, that I was unable to reduce it to its normal position at that time. She was not so situated that she could go to the hospital at that time, but would return the next morning, when I should carry her to the hospital for whatever treatment that I should find necessary for her relief if I were unable to relieve her. I gave her an opiate and let her go home. The next morning I was able to put the retroverted uterus back into its normal position, which gave Mrs. G. immediate relief, and, after a few days that were required for the congestion to clear up, her condition became normal. I do not remember the cause of this accident, but I do remember that it was of a few days' standing before she received the necessary attention to relieve her.

Case 3. Not long since, I was called to see a laundress who was suffering from violent pelvic pains brought on by lifting a heavy tub of water. The neighbors had gathered in to help and were applying hot stupes without availing anything. When I examined, I found her uterus retroverted and soon replaced it. The relief was immediate, and I left her in five minutes feeling comfortable. A week in bed was all that was necessary to complete the job and have her back to her work. No further treatment was necessary and none was administered.

Case 4. The above cases give a clear picture of traumatic retroversion: The intense pain, the interference with locomotion, the enlarged uterus and the immediate relief following replacement of the uterus. Another case came to my office some weeks ago. The lady was suffering from lassitude. She could walk but short distances before she was tired, and she had found walking so disagreeable that she was inclined to lie in bed most of the time. She said that she had never been lazy, but that she had lost all the energy that she had ever had. Upon examination I found her uterus incompletely retroverted. She then told me of a slight accident that she had suffered several months previous to that time. She was inclined to date her lassitude from this accident. Whether the accident, or something else, was the cause of her condition, I am not able to say, but her uterus had remained in that retroverted position so long till it had become second nature for it to be there. With some difficulty, I reduced it to its normal position, and, finding that it was not inclined to remain there, I packed the posterior cul de sac of the vagina with cotton tampons, and let her go, feeling fairly comfortable. The next week she returned without any improvement. The uterus had returned to its retroverted position. I then gave her a Hodge's pessary, showing her how to remove it and replace it, and let her go with the understanding that she should return if she were not relieved. Since that time I have seen her and find her condition like others of this class. She is some better while she keeps the uterus pushed forward with the pessary, but the condition is little better when she is without the pessary. It is not a perfect cure, neither do we expect a cure by any means less than Alexander's operation, which is not always entirely satisfactory. While this patient dates her lassitude from a minor injury, I am inclined to doubt that the injury was the entire cause of that retroversion. This lady had worked in a business house, and, on account of embarrassment, she probably had allowed her bladder to go too long at too frequent intervals without emptying it. This had probably been

repeated so often that the uterus had become fixed in the retroverted position. If it was really of traumatic origin, it was of the neglected type, and could not be relieved by simple replacement. It presents the picture of that type due to other and more prolonged cause than that of traumatism.

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## INDICATIONS FOR MASTOIDOTOMY*

B. F. Hodsdon, M. D.,

Miami, Florida.

Perhaps I should apologize for calling your attention to what may seem perfectly clear to every practitioner of medicine, but even so a time-worn subject may provoke a discussion that will be of some benefit to the essayist, especially if tinged with criticism.

Should this prove to be the case, I will feel that the time spent in reading this paper has not been altogether an aching void. I have endeavored to make this paper so brief that the Chairman will not hold the gavel with impatience, and say "one minute more," as he observes the wearied and painful expression of the audience.

The indication for a mastoid operation is not always a clear-cut picture, even to the otologist. The diagnosis may be plain in the majority of cases, but he is often confronted by the prejudice and dread of an operation that is always manifest in the patient, his family and friends and, sometimes, the doubtful attitude of the family physician.

The operation may be deferred, refused, or another otologist called, whose conservatism may be regarded as superior knowledge, for the patient and family will welcome any advice or method that sidesteps an operation though temporizing may be far more dangerous than the operation in fairly skillful hands.

Now the patient may recover without the operation and who shall say which was the more rational treatment? Operation? No, except by the otologist that advised the operation. Temporizing? Yes, by the patient, family, friends, and, no doubt, the family physician.

The hesitation about an operation for mastoiditis after a positive diagnosis has been made, knowing, or perhaps thinking, that the patient may recover, or apparently recover, by temporizing, has lost far more cases than where the operation has been done as soon as feasible after the diagnosis was made. In a general way the operation is indicated when the acute suppuration of the middle ear has extended to and involved the mastoid cells, and shows no tendency to recover under regular treatment after one or more incisions have been made in the tympanic membrane.

The indications are perfectly clear in cases which have been observed, from the beginning of middle ear inflammation, and when development of mastoiditis could be plainly followed by the classical symptoms.

The operation in such cases is a matter of necessity where in spite of appropriate treatment the bone infection could not have been prevented, but the decision is more difficult in cases of acute mastoiditis which could only be observed after prolonged suppuration, which have not had the proper treatment or perhaps no treatment at all.

Experience has taught us that there are cases simulating mastoiditis, that are nothing but inflammatory irritation, and disappear as soon as the patient is given the opportunity of rest and care, more or less rapidly according to his vital resistance.

In the absence of severe pain and high fever a waiting attitude under strict supervision is justifiable for a time, unless one or more positive indications are present.

Now, the value of separate symptoms, so far as indications for operation are concerned, depends upon the duration of middle ear suppuration; in the early stage of mastoid inflammation, it is not unusual that there are symptoms such as pain or pressure and slight swelling behind the ear; but as a rule these symptoms subside within a few days after paracentesis and the ice bag over the mastoid.

The positive symptoms: One—Severe lacinating pain on pressure at any point on the mastoid bone, that has not been relieved or modified by paracentesis and ice bag behind the ear within 24 hours. Two—A profuse discharge with increasing pain radiating over the entire side of the cranium not relieved by ice bag and local treatment within 24 to 48 hours. Three—A sudden cessation of discharge with increasing severe pain not relieved by paracentesis and ice to the mastoid, is another positive indication. Four—Swelling of the neck on the same side due either to a cervical abscess or an infected posterior

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cervical gland. Five—Complete deafness on same side with nausea, vertigo and mystagmus. Six—Paralysis of abducens (the sixth nerve external rectus) as indicated by diplopia or internal strabismus on the same side during a middle ear suppuration. Seven—Facial paralysis on the same side as mastoid involvement. I have purposely omitted the blood, bacterial and X-ray indications to be brought out in the discussion or in closing the paper.

Case Report: Patient, Mrs. M., 34, of very nervous temperament, not well nourished, married, two children, came to the office for treatment of a nasal discharge, with pain over the right maxillary antrum.

On examination a very small streak of pus was seen beneath the middle turbinate, on the right side. Temperature 100, pulse 90, respiration 18. Transillumination showed both frontal and the left maxillary antrum clear, but the right antrum of Highmore transmitted no light.

These findings were corroborated by the X-ray, also a clear sphenoid and ethmoids. The case was treated locally for two or three days which reduced the inflammation to some extent, but pain in the antrum and headache continued. Four days after the first visit, she went to the hospital and the antrum was opened through the nasal wall without removing the inferior turbinate; irrigation with hot salt solution brought out no pus, but several hours later a profuse discharge drained from the antrum.

Examination for bacteria at the Diagnostic Laboratory showed a pure culture of pneumococcus. Next day, after a chill, the temperature went to 104. Second day only a slight chill followed by a fever of 103. Third day, fever 102. The fourth day after opening the antrum, there was a severe pain in the right ear and on examination the tympanic membrane was found bulging.

A paracentesis was done and the ear drained freely for several days, although the patient refused the ice bag over the mastoid except for short periods of time with long intervals.

Examination for bacteria at the State Laboratory showed only the staphylococcus albea, but several days later at the Diagnosic Laboratory streptococci were found.

As the temperature became normal with only a slight discharge from the middle ear, and no tenderness over the mastoid bone, the patient was allowed to go home, provided she would take a nurse to carry out the treatment administered at the hospital. On arriving home the ice bag was abandoned altogether and the nurse left the second day, and a practical one substituted.

I did not see the patient for several days after she left the hospital, thinking that the nurse was with her, and would advise me if all was not o. k. and the patient convalescent.

About five days after the patient left the hospital I was called, and found her with some temperature, headache and pain, but no tenderness over the mastoid except at one point, about one and a half inches posterior to and on line with the lower wall of the external auditory canal, not more than a third of an inch in diameter.

There was a discharge from a small opening in the drum membrane, an incision was made in the drum down to the periosteum, irrigation and suction brought away considerable pus, temperature came down and the headache was relieved, but the tender spot on the mastoid was still noticeable on pressure.

Suction, irrigation and ice made the patient very comfortable and apparently doing well for three days, when she complained of seeing double at times. The following day there was a pronounced internal strabismus.

I then strongly advised operation that I had previously suggested and after some persuasion and consultation the patient was taken to the hospital for operation.

No pus was found in the antrum, or any part of the wound, except in the diploe just external to the wall of the lateral sinus in trimming down eburnated bone with the roundgear forceps about ten or fifteen drops of pus trickled down.

The wound was closed over a rubber drainage tube and blood clot extending from the antrum to below the site of the mastoid tip. A strip of gauze was placed in the external canal, wound dressed and bandaged.

The outer dressing was removed the next morning, the second day after the operation all dressings were removed and the rubber drainage tube withdrawn about one-half inch and cut off.

On the third day I removed the drainage tube; but the fourth day the patient had single vision, with no sign of strabismus; the stitches were removed on the sixth day, and the patient left the hospital on the tenth day and, as the stereotyped saying is, "The patient made an uneventful recovery."

I have mentioned this case because it seemed an atypical case to me, the chief points of interest being the small area of circumscribed tenderness,

the paralysis of the sixth nerve in the absence of other pronounced symptoms.

The small amount of pus found at the operation, localized so far from the antrum, the rapid recovery of the sixth nerve following the operation, has caused me to wonder if the patient had been more compliant in submitting to local treatment in the early stage of middle ear suppuration would the operation have been imperative?

**DISCUSSION**

*Dr. A. H. Freeman, Jacksonville:*

Regarding the bacterial indication for the mastoid operation, it is well understood and known that two-thirds of these cases are due to streptococcus capsulatus and hemolyticus, and that the other third are due to pneumococcus and staphylococcus or mixed infections. Of course, as you know, the streptococcic infections are the ones that are most apt to give us trouble, and the most serious trouble.

Dench, in his masterly work on this subject, states that the kind of infection you have in the case is what you are going to have afterward. In his study of the mastoid, he shows that 86 per cent of all mastoid conditions are due to streptococcus, that 66 per cent are due to staphylococcus, that 10 per cent are due to pneumococcus, that 92 per cent of the mixed infections with streptococcus and 33 1-3 per cent of the mixed infections without streptococcus, come to operation. So streptococcus is by far the most important infection you have to deal with in the mastoid.

The blood picture is the same as in suppuration.

Crockett, in the *Annals of Surgery* in 1906, thought that he had made a discovery in the fact, as he stated, that the white blood cell count increased gradually up to 20,000 and did not go any higher. His discovery is not verified by later studies.

Of the blood culture in fifty-five cases of acute ear involvement made at the Manhattan Eye and Ear Hospital, New York City, sixteen were positive blood cultures, on operation four of these proved to be lateral sinus thrombosis cases, two were frontal sinus cases, one meningitis, and nine were acute mastoid cases, all of which recovered with a simple mastoid operation. I think this proves that blood bacteria in mastoiditis does not always mean a lateral sinus thrombosis.

Phillips puts it this way: That he does not put too much dependence on blood cultures except when verified by other clinical symptoms.

X-ray indications of the mastoid operation: Your pictures must compare the diseased with the sound side. In the early stages there is only a clouding of the mastoid cells. Daily X-ray studies will show the progress or regression of the process to normal. The X-ray does this for us: It determines definitely the type of mastoid we have, whether a diploetic, pneumatic or dense bone. The wall outline in the first class of cases is hazy. When bone softening occurs, the wall of the sinus groove becomes indistinct. In the third stage, you have total loss of the outline in the area covered by the destructive process.

In the indication for operation, the time limit should never be under eight days. Local tenderness, if it has been present and subsided, should it return, always indicates an operation. Continued high temperature, or if temperature is of the see-sawing or skyrocketing type, indications for operation are positive. If sinus thrombosis and acute mastoiditis occurs in a chronic case, the indication for operation is made positive, as bacteremia must be then present.

Differential disagnosis includes Herpes Zoster, three, four, or five days before eruption occurs. Spheno-palatine irritations must be considered. If cellulitis occurs in otitis externa, guard against later danger by having smear made. A broken down retro-auricular gland which produces intense edema around the ear, would be another positive indication for operation.

*Dr. Sackett, St. Petersburg:*

I have been particularly interested in this subject from the standpoint of the internist. It is not often that we have a chance to get back upon the specialist, and I might say also that it is not often that they get a chance to get back at us.

At one of the hospitals in St. Petersburg last winter the ear specialist had a chance to use an internist. He was getting along nicely in one of his ear cases—had done a paracentesis, had an ice cap on the outside of the head and the child was getting on very nicely, as he thought. Still he was looking out all of the time, of course, for a possible mastoid involvement because this child had a history of chronic and subacute otitis media. All of a sudden the child developed a very severe pain in his left side, and Friend Specialist was very much at a loss to know what might be the trouble in the left side. Called for me. Lo and behold this baby, instead of having a mastoid,

had an acute lobar pneumonia involving the lower lobe of the left lung. During the course of this disease, which ran a normal course, he developed an acute gastritis and pyelitis, with blood and pus in the urine. And during this time the child was about as sick a boy as you can imagine.

Now, I personally, have never, as an internist, taken responsibility in ear cases. My friends, the specialists, all say that I am a friend because I call them in. I believe that all internists should call in a specialist as soon as they get an ear case. I cannot be too positive for that, because I don't believe there is any internist in the world who has any right to take responsibility in ear cases. I work with the specialist, and it does so happen that once in a while the specialist may have an occasion to use the internist.

*Dr. L. C. Ingram, Orlando:*

The problems mentioned by the essayist, that is that we do not always have a clear-cut picture in our symptoms to formulate a diagnosis, also that the cooperation and consent of the patient or those in authority to give us consent is not always forthcoming, of course as we know are problems in all of the diseased processes that require surgical interference, but I do believe that they are more prevalent in this one particular condition of the operative mastoid than possibly any other that is dealt with in the human body.

The prophylactics, or what I may say, are those measures that the Doctor has mentioned that would limit a number of the suppurative mastoids that would require surgical interference. He mentions the paracentesis of the drum membrane and the use of the ice bag, etc. Paracentesis of the drum membrane, I believe, is the most important measure that can be used to limit the number of operative mastoids. When I mention the value of paracentesis of the drum membrane, I refer to it is an early measure. Now, we know that we are not always able to do an early drum membrane paracentesis—we do not always get these patients early. Many times the patient does not seek assistance or relief from his trouble until it has advanced to the point where we cannot do an early paracentesis. If we do a paracentesis of the drum membrane and immediately get pus, we have done the paracentesis too late. Another measure in the plan of prophylactics, we might say, are those diseased processes when the obstruction is in the nose or nasal pharynx, that in so many instances causes suppuration in the mastoid. Of course, when we speak of these we mean that these conditions should be relieved when we find a suppurative middle ear, to prevent recurrent attacks of suppurative middle ear or, if possible, the necessity of an operative procedure in the mastoid.

The question of the surgical interference of the mastoid, of course, would infer that not all suppurations of the mastoid are surgical or require surgical interference. We know that to be true—that only a small number of them require surgical interference because of the fact that the tympanum and that antrum of mastoid cells are one continuous cavity usually, and it would be utterly impossible to have an abscess in the middle ear and not have an abscess of this adjacent cavity. We know that it would be impossible to have a quantity of pus as is obtained in a suppurative mastoid to come from that little space, the middle ear. We know it must be coming from the adjacent cavity—from the opening down to the eustachian tube or deep in the cells of the mastoid. Why, then, do we have to in some cases interfere surgically in order to relieve the patient? It is because it has extended beyond the mucous membrane into the adjacent bone tissue and there set up destructive processes that are going on and on, and require some surgical interference in order to reach the adjacent cavity beyond the drum.

Now, the symptoms—what are they? We know first that we had a disease of the middle ear or primary mastoid, but there are very few of those. We then have had a suppurative middle ear. Usually it has been at least two weeks. Seldom do we have a suppurative mastoid that requires surgical interference within two weeks. It takes about that time for the destructive processes to get to the bone where it requires interference. Also, as the essayist has said, the temperature is not high. In a typical mastoid the temperature is 100 or 101. If you have a high temperature, you have some other complication—some complication that produces a high temperature. Seldom is it a simple mastoid. There is that tenderness the Doctor spoke of, usually the most acute pain or tenderness is over the antrum, anywhere over the mastoid or down in the tip of the mastoid. On placing the little finger over the periosteum it is immovable, as it always is in cases of periostitis. One of the most important symptoms that we have is sagging of the posterior wall of the external canal. I do not believe that you will find a single case where there is sagging of the posterior wall of the external

canal that will not require surgical interference. I don't think it will get well without some drainage and without surgical interference.

I might mention here another method known as the Sawbeck test, which is a test for obstruction deafness. Your Sawbeck test will show whether or not the air or bone conduction is limited. The use of the Sawbeck test is most important in diagnosing the primary mastoid.

Dr. Hodsdon says that he has left out intentionally several points in the paper, including blood picture and X-ray, and only mentioned that they were important. We know that we have a leukocytosis. The X-ray shows us the clouding of the mastoid. All together we must take up these symptoms in order to make up a complete diagnosis and determine the operative interference in mastoid suppuration.

*Dr. R. L. Cline, Lakeland:*

In the prophylactic treatment, the most important thing, to my mind, has been omitted. Most of our acute mastoids occur in children, probably because so many of them have obstruction to their air wave. I believe in the vast majority of our acute mastoids you will find large adenoids and diseased tonsils. So, in your prophylactics you should not only open the drum membrane, but remove the primary cause, which is adenoids and tonsils.

Now as to the time of operation. To my mind there should be no time limit. We should certainly wait twenty-four or forty-eight hours, often one or two weeks. I think that the vast majority of mastoid conditions are never diagnosed or recognized, because, as Dr. Ingram says, I believe it not probable to have a middle ear containing pus that does not extend to the mastoid cavity. I recently had that very forcibly impressed upon me. But this was one of the unusual cases. About twelve months previous I removed the adenoids and tonsils, and made a thorough removal. This case developed an acute mastoiditis, which to my mind was even more unusual because of the clean throat and superior pharynx. This child, about 14 years old, developed a most virulent acute mastoid. I at once made a wide opening in the drum membrane, but instead of the child getting better he got worse. The pain and temperature remained the same for two or three days, and all of the time I felt that it was so virulent that we had better consider operative interference. The child developed pneumonia, and I waited day after day thinking I would like to operate, save for the pneumonia. He continued having very severe localized tenderness, yet after the expiration of about 12 to 14 days, the mastoid subsided without operation.

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## THE RELATION OF TRAUMA TO MALIGNANCY*

R. B. Harkness, M. D.,

Lake City, Florida.

The fact that cancer is apparently on the increase, together with the fact that the disease is one of the major causes of disability and death, furnishes ample justification for any practical discussion of this problem.

I am attempting to bring before you some phases of the cancer problem, that I believe are not given due prominence by the average physician in his daily contact with the public.

I am not offering any new scientific facts, but I am urging the physician to put his knowledge to a more extensive service in the prevention of cancer. For in prevention lies our greatest service to mankind so far as this problem is concerned. This work of prevention can be accomplished only by education of the laity, and it is up to the physician to do this educating.

The true cause of cancer is still shrouded in mystery, but there are many known contributing factors, some of them almost constant, and it is the physician's duty to pass such of this knowledge as can be assimilated by the lay mind along to the public.

The age incidence is an important factor, but can easily work harm by fostering a too fixed opinion as to the occurrence of cancer at a certain period of life. We have all seen cancer develop in the young.

Heredity also undoubtedly plays some part in the production of cancer; just what this part is we do not know.

The one predisposing factor that is constant in the production of cancer is trauma. Without trauma in some form or degree, we do not have malignancy.

Foster[1] says: "There is a general suspicion that repeated slight trauma is a cause for carcinoma, while it is one severe blow that causes

*Read before the Fifty-first Annual Meeting of the Florida Medical Association, held at Orlando, May 13, 14, 1924.

sarcoma. We do know these malignancies are post-traumatic.

In this same article Foster brings out a point of considerable importance in the diagnosis of bone lesions. He states that if more than one bone is found involved the growth is infectious and not malignant. I take it that this restriction would only apply in acute or comparatively recent conditions.

Menetrier[2] makes practically the same plea in a highly technical article which I do not quote, on account of the great length of his argument.

True, this trauma may be of such character as to be unnoticed, but it is always there and without it we do not have malignancy.

A few outstanding examples of this unobtrusive character of trauma that all of us have seen result in malignancy, are the lacerated cervix, the eroded or fissured nipple, the chronic ulcer of the smoker's lip, the ill-fitting dental plate or bridge. These examples might be multiplied, but this is unnecessary. It is just here that the physician may serve his generation well. A passing admonition may go unheeded, but if the physician will take the time and pains to explain to his patients what a fearful risk they are running in allowing these chronic irritations to continue, a great many will seek relief while the condition is perfectly curable. However, we must be careful not to implant in the minds of our friends an insane fear of some certain and mysterious calamity. But we must take the time to assure them of the certain curability of these precancerous conditions, and the great risk they are running of developing an incurable condition by neglect.

Occasionally we have malignancy develop after some particular injury, no different in its character from the thousands of injuries sustained by other individuals, or even by this same individual, with no resulting malignancy.

These cases of malignancy usually, of the long bones, dropping, as it were, from a clear sky, are most interesting to study, and are least understood.

Just why the reaction to trauma in the tissues of one person will be cancer, in another, bone cyst, giant-celled tumor, proliferating periostitis, or ossifying myocitis, while in thousands of others the same character of injury results only in the restoration of the tissues to normal, we do not know, but we are convinced that cancer, usually sarcoma, does occasionally result directly from trauma.

This fact has been recognized by the medical profession for a long time. Gross[3] published an article in 1879, in which he states that nearly 50 per cent of the cases of bone cancer listed in the literature of that day gave a history of antecedent trauma.

Coley[4] finds in a review of fifty cases of sarcoma of the long bones, that 56 per cent gave definite history of injury preceding the development of the bone tumor.

In the same article Coley lays down the following conditions that he thinks must be met to establish direct relationship between the trauma and the resulting malignant condition.

(*International Journal.* Page 82. Four conditions):

1. There must be positive evidence of a definite local injury. The severity of the injury is not of great importance; even a slight injury, such as striking against a piece of furniture, a fall, or a kick, may be sufficient to be a causitive factor. The injury may be in the form of a recent fracture, as was found to be the case in six of fifty giant-cell tumors.

2. There must be evidence of integrity of the part prior to the injury—in other words, it must be reasonably clear that there was no tumor in the bone at the time of the injury.

3. The site of the tumor must correspond with that of the injury.

4. The date of the appearance of the tumor must not be too remote from the time of the accident.

Bloodgood[5] states that the industrial commissions of a half-dozen States have ruled that in cases of malignancy developing after accidents, should there be no evidence of prior malignancy, the direct relation of the trauma to the subsequent malignancy must be recognized. In the same paper he states that in reviewing one thousand cases of malignancy, about four hundred of which were sarcoma, he found two cases in which immediate X-ray showed bone negative, and later developed malignancy.

We can easily see that the industrial physician is placed under a tremendous responsibility. He must be the arbiter between employer and employee, and it is to him that both look for a square deal.

To this end, every injury, no matter how trivial, should have careful attention, and while entirely impracticable to X-ray all injuries, certainly all in which there is a question of injury to the bony structures should be X-rayed. In all cases slow in healing or showing reaction out of

proportion to the severity of an injury, the physician should safeguard the situation by having an X-ray examination, and this repeated, should the case continue slow in clearing up.

It is needless to add that all such cases should be given a Wassermann.

CASE REPORTS

Case 1. J. J. H., white male, age 45. Railroad engineer. Consulted me January, 1912, about a small lump on his left leg. Family history negative. Physical examination negative except for an enlargement just below tuberosity of left tibia. This did not have the appearance of an inflammatory enlargement, nor was it sufficiently painful or tender. Patient gave history of having struck his leg against a crosstie about three months previously in jumping from his engine. Did not think that he was hurt and had not noticed the contusion after the first few days, until he found the enlargement. Leg was placed at rest for a few days but did not improve. Wassermann was negative. Specimen of tumor was removed and submitted for immediate examination, which was done by frozen section method. Pathologist's report was spindle-celled sarcoma. Amputation in mid-third of thigh. Recovery, and patient has remained well, so far as any recurrence is concerned.

Case 2. William S., white male, age 8. Brought by his father in June, 1921, on account of swelling of his right leg. This was found to be enlarged to a considerable extent, the swelling involving more especially the outer aspect of the leg. Family history was negative. Physical examination negative except enlargement of leg. Child had been playing while at school several weeks previously and had been struck on leg with a stick; no apparent damage. The swelling had been coming on for several weeks. X-ray examination showed that the growth was confined to the fibula, which was extensively involved; the growth apparently starting in the mid-third.

On account of the extensive involvment of the soft tissues amputation was considered the safest procedure but was refused. Patient was lost sight of until September, 1921. At that time the leg was much enlarged and X-ray examination showed that the fibula was practically destroyed. The tibia was still uninvolved. Amputation with unfavorable prognosis was accepted, and was made high up in upper third of thigh. There was a good operative recovery, but the child died in about three months. I did not see the patient in last illness, but from the history the cause of death was metastasis in liver or lungs.

## DISCUSSION

*Dr. J. W. Alsobrook, Plant City:*

I have enjoyed Dr. Harkness' paper—not so much as for what he tells us about the cause of cancer—but his calling our attention to the fact that this is a very, very important question.

The Cancer Commission has gotten out a little pamphlet which you can read in two hours, telling us all that we know about cancer. In that pamphlet they discuss the symptoms, type, and time for operation in practically every region of the body. Therefore, they denote very little time to the causes of cancer. It is cheerful to hear any one speak on the prevention of cancer. I hope the day will rapidly approach when we can, with some degree of certainty, feel like we can do something to prevent cancer. But while I was listening to the Doctor read his paper, I was just thinking that the man who is doing general surgery, with the various number of automobile accidents that occur every day, if he had to look on every one of these little minor injuries as a potential cancer.

I believe in my personal experience I have seen a few cases of sarcoma follow trauma, but the percentage is very, very small, and I don't believe there is any way in the world of knowing which case will cause a sarcoma and which will not. I think we will all be a lot happier if we do not consider traumatic irritation as a potential cancer very seriously.

I note that Foster, who was quoted by the essayist, has a suspicion that trauma causes sarcoma. I believe it is caused and has been after many years of constant repeated irritation, but I don't believe that you can class irritation and trauma as synonymous terms, although the Doctor may have used them in a similar manner in discussing the cause of carcinoma. That seems to my mind the greater cause of the larger number of carcinomas, but as to what is the cause of sarcoma, it is absolutely impossible to tell. You see them from the cradle to the grave. We find them in infants. I remember one of my cases. We thought he had a peri-nephritis abscess, got him all ready and operated. We found he had a sarcoma of the kidney. Fortunately we completed the operation safely, although the patient died. The little fellow died of shock. One other

patient of mine, who was less than two years old, had sarcoma of the mesentery. He developed gastritis and died in less than eight weeks. It is appalling when you look at the lack of knowledge on the cause of malignancy. I hope that this paper will stimulate a lot of thought along that line alone.

We have had a wonderful cancer commission that has been working a long time, and they publish their findings in a little pamphlet that can be read in two hours—and that is what we know about cancer.

*Dr. E. H. Teeter, Jacksonville:*

This subject has impressed me for years. As the Doctor states, the precancerous lesions are moles, warts, fissures, torn cervices, etc. These he says are precancerous lesions. In my work of surgery, I have known people to come to me with cancer from a mole, or wart, and many times they give me a history of getting an injury to that mole or wart. This is followed by a certain amount of inflammation and infection, and following this the growth commences to enlarge. I think that the great majority of cancers are caused from this one thing, and that is—injury with inflammation.

You may have the injury with traumatic inflammation, or you may have the injury with inflammation caused by infection. I feel that the majority of cancers are caused by one of these two things.

*Dr. T. G. DuPuis, Lemon City:*

This subject is a very interesting one. In speaking of trauma, I am somewhat of the opinion, as one of you gentlemen brought out, that if all cases of potential injury caused active malignancy, it would extend so rapidly that it would include the greater part of our country in a very short time. However, I do feel that in the treatment of trivial hurts and wounds, a great many times, if we understood the true nature of them, we could do much to prevent future malignancy.

I wish to say again, it is the little things that we meet in our daily practice that count. Most of us have gotten the idea that if we don't get the big cases we are not doing good work. It is the little details in the everyday commonplaces—they are our precancerous stages.

There is one more point. Much progress along this line has been made through education, that is information largely through a regular provision that teaches that cancer is inherited, and any man who would ask us how it is inherited is an ignoramus. It also teaches preventive measures. Many physicians say that the little conditions, such as pimples, moles, scars and little benign tumors that patients come in with are cancerous. He does not tell the patient the truth because he will lose his confidence, but prepares some of the regular things to help him, and the patient goes out and proclaims him a great savior. Now, gentlemen, that is a mistake. It is a wise man who makes mistakes and gets better. There is no help for the man who cannot make a mistake. When we tell a patient he has cancer, let us know when to speak and know what we are diagnosing. When we tell him it is a benign tumor or simple infection, to go on and not notice it, let us beware of what we speak, for these are things that are going to be talked over outside, and may be grossly exaggerated. The least aggravated person will do that. Many times he will go to some fellow who proclaims that he is a specialist—who in reality is a freak. To keep our patients' confidence we must tell them the truth, but we must know that it is the truth. If the condition is benign we know it is easy; if it is malignant we have to say so. Frankness and truth have never been too good nor too serious, therefore let us put it plain to the patient.

*Dr. Vaughan, Tampa:*

I would like to ask Dr. Harkness one question regarding this subject, and that is: Does cancer go hand in hand with civilization or not?

Because, in my experience in British New Guinea, which has a gross population of some three million people, we never came across a single case of cancer. When I say "we," I submit the names of Sir Wm. McGregor and several other medical men who were stationed there. None of us ever saw a case of cancer. These natives were evidently immune. If trauma had been all that is required to produce cancer, I am sure there would have been a great many cancers, because on the least provocation a native will pick up a club and land you on the back of your head—or rather his neighbor. Now, I want to know if this causes, or could this cause, cancer or is it that cancer is not known amongst them?

*Dr. Jeffrey, Coconut Grove:*

This question of cancer has been thrashed out for the last 20 years, and before that, and during that length of time everybody who has been doing any serious work on the question has taken the old *Connhein* theory and has tried to revise it. But the more they talk, the truer the *Conn-*

*hein* theory becomes. These talks have been all the way from minor institutional studies to the more careful work done by the Rockefeller Institute. The best men of the country have been working for several years on the National Cancer Commission, and their answer is that they don't know. We don't know.

There has been unquestionably a tremendous increase in malignancy in the last several years, and it is on the increase today. There are perhaps two reasons for that increase which have nothing to do with the existence of the cancer itself. One is that the average life has been prolonged over a considerable period of time. Reasonably suppose that the auto injury is carried over five, ten, or fifteen years of life, and you will readily see how that would cause an increase in cancer cases. Another reason is the question of more accurate diagnoses today—the principal thing as I see it.

Now, the education of the public is going to teach the layman, and particularly the laywoman, in the event of these conditions, to seek relief early. We all know that if we get our malignancies early enough, and if we get them in a condition where we can do a radical excision, we all know that these people have a far better chance of recovery than if they run along to a time when all we can do is a relief operation or none at all.

Now, there is one more point—the question of the precancerous state or conditions. Several men have gotten up a list of these. In their opinion, if subjected to irrigation, trauma, inflammation, etc., can produce cancers or malignancy, and these have been called the precancerous stages and conditions. Also pimples, moles, warts, lacerated or eroded cervices, etc., have been called precancerous conditions. Gentlemen, I might say if the simple auto accident or the lady who gets hit on the head with a club; if every mole should be looked at as an incipient cancer; if every pimple or carbuncle should be looked at as a potential cancer; if every eroded or lacerated cervix has to be looked upon as a potential cancer—then I don't want to practice medicine any more.

*Dr. R. B. Harkness, Lake City (closing):*

I want to thank all of you for the very liberal discussion you have given this paper. That is what I had hoped to elicit. It is only as we discuss these problems freely do we get anywhere.

In conclusion, I want to say that I do not want you all to fuss over these little injuries or lose any sleep thinking that you are passing up a potential cancer. What I asked you to do was to treat these minor injuries carefully, for in most instances these results may be abolished in the application of a little iodine and putting on clean dressings, and having your patient come back for observation, or certainly impressing on these patients that if any untoward symptoms come to light that means he must come back for inspection. Now, I was very careful to state that it was not necessary to X-ray all of these injuries, but we certainly should give all potential bone injuries the benefit of an X-ray examination. That should not be considered as too great a burden upon us. A very striking separation is made by Foster between these chronic forms of irritation, factors that produce a carcinoma, and the occasional isolated trauma, which he believes to be one of the causative factors of sarcoma. As he states, "We do not think these cases of malignancy are post-traumatic."

Dr. Teeter very properly alluded to what are the precancerous conditions. The precancerous conditions as are recognized by us generally are not precancerous and certainly not early malignancy. Your warts, your moles, and your pimples are your true precancerous conditions.

I am very glad indeed to enlighten Dr. Vaughan as to the occurrence of malignancy in uncivilized nations. Note the cancers on the arms and thighs produced by the Hottentot and the Chinese in carrying these little charcoal baskets around with them, and other instances of cancer in the cheek and in the mouth produced by constant irritation from chewing nuts. They are not civilized, and do have cancers.

I eluded to the fact that we do not understand the immediate causes of cancers. There are theories galore—just as many theories concerning the etiology of cancer as there used to be remedies applying to diabetes. But these predisposing causes that Dr. Teeter alluded to are certainly things that we do know about. We know that each of these irritations—moles, warts, etc., do produce cancer, and I don't think it is too great a burden for the physician to assume the responsibility for these conditions, for it is only as we consider these little irritations, such as moles, pimples and warts, that we are ever going to get anywhere in the prevention of cancer. We must therefore consider it our duty to look upon each of these moles, pimples and warts as a potential cancer. We can discharge our duty with no smaller effort than that.

# MENSTRUATION FROM A NEW VIEWPOINT*

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The preceding theories of menstruation adhere more or less closely to the known and hypothetical changes which take place in the uterus and ovaries. One writer states that it may provide a rich pabulum to nourish the embryo.

This article presents the suggestion that menstruation may be a function established to provide blood albumen as support and possible nourishment for an ovum during the predecidual period.

Observations made on the life cycles of many disease-bearing insects have revealed the fact that ova are never stationary. Some degree of rotation seems to be a biological need. Take for example, mosquitoes. The anopheles selects vegetable matter in a watery incubator. The culex mosquito places her eggs in the form of a raft, while the anopheles places hers in designs referred to as floats. The yellow fever mosquito "lays eggs singly in small irregular groups some distance above the water. They are laid in from one to seven days after the female has fed upon blood" and usually after successive blood meals.

Insects seem to show a selective foresight in placing their ova. This is shown by the positions selected for the development of their fertilized ova. They prefer quiet waters, grass blades, water lilies, pieces of stick, rocks, threads, hairs, the under side of leaves, etc. The ova of frogs are laid singly or in small clusters, while toads lay them as long, unbroken strings and in each case they maintain this original design until such time as their development reaches a stage when the individual embryo can exist independently. The ova of many of our disease-bearing insects are deposited in masses. Many fish ova are deposited in the water and are fertilized there. When the ova are discharged in masses they are held together by a glue-like substance to some support. Take for example the head louse; she deposits her egg on a hair or thread and cements it there.

The study of chick embryology shows that the eggs in the incubator must be rotated twice daily for a certain number of days in order to prevent deformities. All setting hens do the same thing for the eggs in their nests. It is only when the fertilized hen's egg is placed in proper conditions, and not till then, that segmentation begins.

The shape of all ova is such that a rotary motion may take place with a minimum of jar. When it comes to the perpetuation of a species, nature is extravagant in the extreme—she does nothing useless or purposeless.

Many insects protect their eggs with a gelatinous substance. It is known that the ovum of many animals becomes surrounded by a gelatinous covering. In rabbits this envelope becomes enormously thick about the blastodermic vesicle and this is the stage when the human embryo is supposed to enter the uterus.

The few instances cited suggest, first, that ova are generally protected or supported by some kind of an adhesive or glue-like substance, and, second, that a limited amount of movement is essential to prevent deformities.

Perhaps you are asking how this has anything to do with menstruation. In textbooks the term implantation is used to describe the manner of the embryo's attachment to the uterine mucosa. One textbook goes so far as to say, "That the human embryo penetrates the mucosa as would a parasite." Let us suppose that a fertilized ovum is discharged from the fallopian tube into the uterus, it is nothing more than reasonable to conclude that the menstrual function had some share in preparing for its reception.

Menstrual blood, we know, differs from blood from other source in its normal noncoagulability. Why this is so no one has as yet satisfactorily explained. Something may have been added, something may have been held back. In the hours while the decidua are developing could anything support, protect or permit motion of the ovum better than blood albumen? The albuminous cradle of the chick may have its counterpart in the human provided by blood albumen during the first hours of intrauterine life.

The position of the human subject is such that special provision needs to be made for the protection of the ovum during the period when its existence, purely from a mechanical standpoint, is precarious. If this theory has any basis of fact in it one can readily see that any deviation from normal blood (such as is found in syphilis) would have a profound influence on the developing ovum.

*Read before the Fifty-first Annual Meeting of the Florida Medical Association, held at Orlando, May 13, 14, 1924.

By way of a summary let us define menstruation as a function established to meet the biological requirements of fertilized ova. This theory was first presented in an article entitled "A New Theory of Menstruation," published in the *New York Medical Journal* November 7, 1923.

BIBLIOGRAPHY

American Textbook of Physiology.
Barber and Copenhaver—Cerebral Control of Uterus. Exp. Biol. Med., 1916, 13, 156.
Barry, D. T.—Uterus, contractions and ovarian extract. Jour. Phy., 1915, 50, 259.
Brubaker, A. P.—Physiology.
Burton Opitz—Viscosity of Blood. Amer. Jour. Phy., 35, 951, 1914.
Ibid.—Arch. Phy., 82, 447, 1900.
Ibid.—Jour. Phy., 32, 8, 1904.
Chick—Viscosity of Blood Proteins Solutions, Biochem. Jour., 8, 261, 1904.
Cushny—Movements. Jour. Phy., 1906, 35.
Da Costa—Clinial Hematology.
Fox—Coagulation of Blood. Lancet, 1908, p. 99.
Geddes and Thompson—Sex.
Gutland and Goodall—The Blood, a Guide to Its Examination and to the Diagnosis and Treatment of Its Diseases. 1912.
Hammond and Marshall—Correlation Between Uterus, Ovaries and Mammary Gland. Pros. Roy. Soc., 1914, 87, 422.
Heape—Monkeys. Brit. Med. Jour., December 24, 1898.
Howell, W. H.—Physiology.
Keith, Arthur—Human Embryology and Morphology.
Keibel and Mall—Human Embryology. Vol. 2.
King, J.—Cardiac Vascular and Temperature Variations on Women. Amer. Jour. Phy., 1914, 34, 203.
King, Jessie L.—A Study of the Anticoagulating Substances in the Mucous Membrane of the Uterus. Amer. Jour. Phy., October, 1921.
Loeb, L.—Production of Deciduomata. Arch. f. Entwick. D., 1908, 27.
Lillie, F. R.—The Development of the Chick.
Loeb, L.—Correlation Between Cyclic Changes in Uterus and Ovaries. Biol. Bull., 1914, 37.
Luciana, Luigi—Human Physiology.
Marshall and Runciman—Ovary and Oestrus. Jour. Phy., 1914, 49, 177.
Marshall and Jolly—Dog. Phil. Trans., Roy. Soc., 1905, 198, 90. Menstruation and Ovulation in Monkeys and in the Human Female.
Minet, C. S.—A Laboratory Textbook of Embryology.
Ott and Scott—Action of Glandular Extract on Uterine Contractions. Jour. Exp. Med., 1909, 14, 326, 1909, 11, 326.
Patten and Cragg—A Textbook of Medical Entomology.
Proceedings of the Class formed to study Entomology, Washington, D. C., 1918.
Prentiss, Chas. W.—Embryology.
Retger—Mechanical Factors in Clotting. Ibid., 24, 429, 1909.
Riley and Johannsen—Handbook of Entomology.
Stewart, G. N.—Physiology.
Wilson, E. B.—The Cell in Development and Inheritance.
Zak—Relation of Plasma Lipoids to Coagulation. Archiv. of Exp. Path. in Pharmacy, 79, 274, 1912.

## DISCUSSION

*Dr. W. M. Rowlett, Tampa:*

This is, indeed, a very interesting paper that Dr. Young has produced, because it is original, and I hope she will continue her research along this line, which will, no doubt, throw very valuable information upon the phenomenon of menstruation. I am sorry that she made it so brief. I wish that she would have gone more into detail as to the cycle of menstruation.

I take it for granted that you all agree, and that she does, that we consider menstruation as an endocrine phenomenon. She, no doubt, figures that you have carried the picture of menstruation closely allied with the maturing of the Graafian follicles, of the meconium, and the preparation of the decidua for the reception of the fertilized ova. I can understand the theory of the necessity for blood albuminate, and that the sponge tissue that makes up the decidua could possibly absorb a sufficient amount of blood albuminate in which to nourish the fertilized ova.

I am sorry that she did not devote more time to the mosquito and the other low life animals or insects. It is said that the female mosquito, in order to properly nourish its fertilized ova, must feed upon blood. It is possible that the mosquito could help her in solving this important question.

I would like to ask Dr. Young, while we are on the question of sex, if she has ever given any thought as to what takes place between the male and the female spider in the fertilization of the female ova. It is a fact that she turns upon her male spouse and devours him. The thing that I should like to know is whether the male contains some necessary food value that is necessary for the development of this fertilized ova.

We have a family of marsupial animals, or animals belonging to the marsupial family, which might discourage Dr. Young's theory inasmuch as we know that the female does not have a uterus—that is not a typical uterus. Belonging to that family, as you know, are the kangaroo and the opossum. The female has a tube connecting with her genitals, branching off and leading to each of the mammary glands. After the ovum has become fertilized it travels down this little tube and finally lodges in one of these mammary glands, which is protected by a so-called pouch, and there develops. It enters the gland and develops, externally, you understand, being protected by this pouch. It is a question to me whether this aids her or discourages her in the question of the necessity of blood albuminates.

*Dr. John B. Black, Jacksonville:*

Novak's work, printed in 1922, perhaps gives as much information on research work of this type as can be obtained at present date. It is practically acknowledged by all that the ovary plays a conspicuous part in the etiology of men-

struation. The mucus membrane of the uterus is the immediate source of the menstrual blood. What this blood does in line of preparation for reception of an ovum is a disputed point.

The important constituents of the ovary from a functional viewpoint are: 1. The follicle; 2. Corporalutes; 2. The interstitial cells.

The corpus luteum theory of Fraenkel perhaps stands out foremost as the underlying cause of menstruation. He believes that the corpus luteum must be looked upon as ductless gland, which is renewed every four weeks during the sexual life of a human being, and at different periods in various lower animals, its function is to maintain the nutrition of the uterus from puberty to menopause and to prepare its mucosa for the reception and maintenance of the ovum. If the latter be fertilized the corpus luteum is important in the fixation of the ovum and its nutrition during the early months of pregnancy.

Marshall does not accept the findings of Fraenkel, although he believes that the ovary provides an internal secretion. He considers that this is elaborated by the follicular epithelial cells or the stroma rather than by corpus luteum. This secretion circulates in the blood and produces a series of changes, which at least assist phenomena of heat or of menstruation. After ovulation, which occurs normally in lower animals during estrus, the corpus luteum is formed and this organ elaborates a further secretion, the presence of which is essential for the change taking place during the attachment and development of the embryo in the first stage of pregnancy.

The most extensive experimental investigations have been conducted by Loeb, and carried out principally on guinea pigs. He believes that the uterine cycle in these animals can be divided into two periods. The first, which comprises the charges associated with heat and ovulation, he does not believe that is due to the activities of corpus luteum, but is actually inhibited by it. On the other hand the second stage, characterized by disidual reaction and by phenomena of secretion in the uterine gland, depends upon the presence of corpus luteum.

Essential as the ovary is to menstruation, it must not be forgotten that the latter function is subject to profound influence by many other endocrine glands. For the present assuming that the ovary is primarily responsible for the menstrual process, there are other factors linked in the menstrual chain which desire explanation. How does ovarian harmone bring about the hyperemia of menstruation? It either acts directly on the blood vessel walls or it produces its effect through the vasomotor nerves.

Physiologists are prone to speak of any relay station in the spinal cord, or elsewhere as a "center," and from this point of view some have spoken of a so-called menstrual center, usually described as being located in the lumbar portion of the spinal cord. While there seems to be no definite knowledge concerning such a center, there is no question that the vasomotor nerves of the pelvis plays an important role in the production of the hyperemia which is perhaps the most conspicuous feature of menstruation.

The vasomotor nerves are the offshoot of the sympathetic and through the rami-communicantes are linked up with cerebrous spinal system and even with psychic centers in the brain. No consideration in the physiology of menstruation can be complete without the assumption that a local factor in the endometrium, which in some way increase the permeability of the blood vessel walls to the blood elements of menstruation. According to Samson it is especially the small veins of the endometrium which give passage to these elements. Just what the factor is, how it is formed, and how it acts, has not been determined. This question is closely bound up with the consideration of why the menstrual blood is noncoaguable. Whether the same local factor is responsible for the noncoaguability of the menstrual blood as well as for its passage through the vessel wall, and whether the substance is a harmone, or an enzyme, are questions which cannot as yet be answered.

In the final analysis, however, it seems probable that the formation of the substance in the endometrium is dependent upon the ovarian function, Schickele's work indicates, the substance is actually formed by the ovaries and given off in the endometrium.

*Dr. William R. Warren, Key West:*

If the phenomenon of menstruation is to be considered as the preparation of a pabulum for the ovum, will Doctor Young explain the phenomenon in the woman who does not menstruate or has never menstruated and yet becomes pregnant and bears children?

*Dr. Anne Young (closing):*

This theory may be nothing more than a little bit of medical imagination that has gone down on

paper. It is interesting and that may be all that there is to it. I have thought of the possibility of a woman who never menstruated becoming pregnant. If albumen is a necessity for the development of the ovum it is conceivable that a very scant period might precede which would provide sufficient albumen and yet not be accompanied by a visible discharge.

The case of the marsupials in no way detracts from the theory. Their young are born when extremely small and imperfect and are placed in the pouch for further development.

The only lower animals having a bloody discharge during the oestrum are the monkey, which has a fairly free discharge; the dog has a slight discharge and the horse about a thimblefull during the preoestrum. All other animals have a mucus discharge at that time.

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## THE TREATMENT OF SEPTICEMIA AND LOCAL INFECTIONS BY INTRAVENOUS INJECTIONS OF THE ACRIDINE COMPOUND, NEUTRAL ACRIFLAVINE*

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In the treatment of sepsis of any form we are naturally inclined to welcome any sort of treatment that will restore our patients to a normal condition in the shortest possible period of time. Those of us who have had experience with these patients can readily draw a mental picture of the too often fatal end. On the other hand, identical clinical pictures that clear up like magic under any form of intelligent treatment naturally create a very pleasing contrast.

My attention was first called to the "Flavine" group early in 1919 while on a visit to The Touro Infirmary and Charity Hospital, New Orleans, La., by Dr. H. W. E. Walther, a noted urologist. Dr. Walther was using acriflavine in 1:1000 solution for lavaging pyelonephritic kidneys. Some of these were sequels to the 1918 epidemic of influenza. Those coming under my observation were of the pneumococcus, staphylococcus, and colon bacilli types of infection. At that time the Doctor was very enthusiastic regarding this method of treatment. He was also treating urethral and bladder infections with proflavine with good results.

In reviewing the literature I found my first information on which to build my hopes in Oxford Loose-Leaf Surgery by Browning:[1] He says "flavine" antiseptics are the most powerful antiseptics so far known for both staphylococcus and the colon bacilli in the presence of serum; and as compared with other substances, they show a similar high-grade potency towards other pathogenic organisms such as streptococci and the anaerobes. Their action is preeminently antiseptic; *i. e.*, very great dilutions, such as 1:100,000, inhibit the activity of bacteria and ultimately kill them; at the same time, concentrations as high as 1:1000 do not damage the reparative or protective mechanisms of the body tissues. These substances are comparatively unirritating to delicate epithelial membranes.

"Acriflavine and proflavine are equal in antiseptic power; the latter has been found to possess some hemostatic action. In view of the fact the activity of these agents is not annulled by the serous exudate of wounds, but rather enhanced thereby, the indication is to avoid an excess of watery fluid and renewal of the antiseptic. A suitable method of treating local wounds is by gauze packing saturated with 1:1000 solution in normal saline. Several ounces of 1:1000 may be safely injected subcutaneously or left free in the abdominal cavity."

Mark, H., and Olesker, L.[2] have used massive doses of the acridine compound, neutral acriflavine, intravenously in endocarditis, otitis media, and puerperal fever, using 30 to 40 cc. of a 0.5% solution intravenously with remarkable therapeutic effect. In their paper they report other German authorities getting results in influenza, acute arthritis, in septic disease processes with variable success.

Davis,[3] of Johns-Hopkins, made a study of the antiseptic properties and renal excretion of 204 aniline dyes. "With only two of these, however (proflavine and acriflavine), was it possible to demonstrate the secretion of antiseptic urine following intravenous medication." Together with Beck[4] he concluded: "Proflavine and acriflavine, administered by mouth in 0.1 gram and even 0.05 gram dosage, to normal individuals is secreted in the urine sufficient concentration to render the latter an unfit culture medium for the colon

*Read before the Fifty-first Annual Meeting of the Florida Medical Association, held at Orlando, May 13, 14, 1924.

bacillus and staphylococcus, provided the reaction of the urine is alkaline."

Levy[5] concludes that this drug should be given a trial in a wide variety of infections after getting so brilliant a result in such a malignant type of Ludwig's angina.

Case 1. Acute fulminating appendicitis. A. L. M., a man, admitted July 1, 1922, after having been brought in some thirty miles over a rough road with acute pain in abdomen of six hours' duration, was left alone until next morning on account of my absence from city. A diagnosis of acute appendicitis was made and abdomen immediately opened. I found free pus in abdomen and a worm-eaten type of appendix. Temperature at time of operation 104 Fhr. Appendix was removed and wound closed and a small cigarette drain placed through a stab wound. The abdomen was filled with 1:1000 solution of acriflavine before closing. In 24 hours temperature was normal and a rapid recovery resulted without discharge. Patient left hospital on the tenth day.

Case 2. Staphylococcus septicemia, and extensive pelvic cellulitis following abortion and retained secundines.

Mrs. M., age 36, multipara, admitted March 3, 1923. She had been sick for three weeks following curretage for retained secundines believed to be caused by abortion, self-induced. Her temperature had been ranging from 102 to 105, with daily and twice daily chills. Temperature 105 when admitted, hemoglobin 20%, leucocyte count 40,000, abdomen distended and extreme tenderness, uterus fixed and palpable mass in pelvis, extreme emaciation and toxic condition, 30 cc. containing 0.25 gram neutral acriflavine, pro injections, was administered intravenously. The temperature next morning was 101. No more chills. The dose was repeated in twelve hours, and again in twelve hours. The following morning, March 5th, temperature was normal, and abdominal tenderness and pelvic mass rapidly subsiding. The same dose was administered that morning and the following morning. Temperature remained normal from the second morning and convalescence was unmolested. Patient left the hospital in three weeks, and after two months was able to have the diseased appendages and appendix removed.

Case 3. General septicemia due to colon bacillus, during puerperal period.

Mrs. W. B. A., mother of five children, always healthy; meddlesome examination of negro midwife before delivery. On June 17, 1923, a normal delivery. Three days after delivery she had a chill, followed in six hours with another chill, a lapse of 12 hours and another chill with a temperature of 105, pulse 140. Blood examination; leucocytes 20,000, reds 4,800,000, poly's 80%. Blood culture revealed colon bacillus. Twenty-five cc. neutral acriflavine repeated in twelve hours, after which temperature dropped to normal with a rise to 101 in six hours, when another injection was made. The following day temperature was normal and continued normal. On the fourth day a culture taken from the blood was sterile. The rapidity of restoration to normal health was almost unbelievable.

Case 4. R. L. M., a man, age 55, colon bacillus infection of blood stream following urethritis.

Two weeks following a neisserian urethritis this man had a chill, followed by a temperature of 103, temperature dropped to 101 in the course of 12 hours, to be followed by another chill at the expiration of 24 hours. At the end of three days an examination of the blood revealed a colon bacillus infection. Intravenous injection of ¼ gm. in 25 cc. normal saline was administered, after which temperature rapidly resumed normal. A second injection was administered 24 hours later. No further treatment was given. The discharge from urethra also stopped. In a few days patient was well.

Case 5. H. S., a male, age 56, received an accidental cut on right hand. Twenty-four hours later he had a chill, followed shortly with a temperature of 104 2/5; arm intensely swollen, with red lines running from hand to shoulder. No blood culture was made, but an intravenous injection of 25 cc. 1% neutral acriflavine, pro injections, was given. Next morning temperature was normal, arm much reduced in size, red lines having disappeared. He thought he was well and went to work. After three days arm began to swell again, and infection began to localize over thumb. An anæsthetic was administered and wound laid open. Two more injections were given at 24-hour intervals, following which he made a rapid recovery.

Case 5. Pyelitis due to colon bacillus and staphylococcus aureus; renal calculi; sterilization of urine.

Male, age 54, with a history of severe pain in right side for past month. These attacks of renal colic were followed by hematuria. X-ray showed stone in right kidney. Urine examination re-

vealed pus, blood, colon bacillus and staphylococcus aureus. Patient was having severe chills, and a temperature ranging from 103 to 105, and very septic; in fact patient was in a semi-comatose state. After the administration of 30 cc. of 1% solution neutral acriflavine intravenously the temperature began to fall at once; patient became conscious and improved steadily. The yellow discoloration of the skin remained for one week after the last dye was administered, proving a faulty elimination. After five days' treatment the urine was sterile, and he was apparently cured of the septicemia. Two weeks later he gradually developed anuria and succumbed from uremia. It is possible that multiple repeated intravenous injections would be advisable in such cases, but they would have to be given with care, as we do not know the limit of safety for repeated injections.

The cases just reported were very virulent and seemingly desperate, and the results, apparently, miraculous. I have used the same treatment in many other cases of much milder types of infection with good results. In two cases of streptococcus hemolyticus I derived no apparent benefit. In empyema following pneumonia and pleurisy the duration was much shortened, and the discharge stopped within ten to fourteen days after daily irrigation with a 1:1000 solution; previously in my experience, drainage kept up several weeks. Equally laudable claims have recently been made in literature for mercurochrome, gentian violet, phylacogens, bacterins, and various serums administered both intravenously and subcutaneously. Personally I have been disappointed with serums and phylacogens in the majority of cases. Yet, at times, I have attributed marvelous results to the use of mixed infection phylacogen in desperate and apparently hopeless cases. My cases treated by the flavine dye may have been providential, but so many favorable results naturally remove a great deal of our skepticism.

To secure satisfactory results, always use freshly made solutions prepared from the dry powder in freshly distilled water after making a normal saline solution.

### CONCLUSIONS

The ideal way of combating infections, both general and local, would be by free drainage, proper surgery, elimination, supportive measures, and the intravenous injections of harmless chemicals.

In acriflavine, pro injections, we have a valuable agent with which to sterilize the blood stream in many infections.

The results so far obtained are sufficient to give us much encouragement and optimism for the future.

### BIBLIOGRAPHY

[1]Browning, C. H.—Oxford Loose-Leaf Surgery, Vol. I, p. 903.

[2]Mark, H., and Olesker, L.—Deutsch. Med. Wochens., Jan. 5, 1923. No. 1, p. 17.

[3]Davis, E. G.—Amer. Jour. Med. Sciences, 1921, 161-251.

[4]Davis, E. G., and Beck, G. H.—Journ. Urol., March, 1921, 5:215.

[5]Levy, David H.—N. Y. Med. Journ. and Med. Record, Jan. 3, 1923. Reprint.

## DISCUSSION

*Dr. J. V. Freeman, Jacksonville:*

There is just one point that might be brought out in reference to the very valuable paper of Dr. Davis: That is, he reported the lack of results from two cases due to streptococcus hemolyticus. I have it, on Dr. Barker's authority, that mercurochrome 2% is a specific for that particular infection.

*Dr. J. C. Davis (closing):*

There is nothing further to add, except that we might say that in using this preparation we should not use the proflavine for intravenous injection on account of the sulphuric acid that it contains. Also, we should not use acriflavine on account of the hydrochloric acid radical. After eliminating the sulphuric acid radical from proflavine we get acriflavine which is still unsatisfactory for intravenous injection because it contains an element of hydrochloric acid. After this is neutralized we get the neutral acriflavine, and it is the latter preparation used in intravenous injections.

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## A BOOK OF IMPORTANCE IN THE PRESCRIBING OF DIETS

The dietetic importance of pure, plain, granulated gelatine has attracted so much attention, and the demand for more information has reached such a volume that the laboratories of the Charles B. Knox Gelatine Company have prepared a book of dietetically correct receipts with gelatine, for diabetes, nephritis, high blood pressure, gastritis, gastrointestinal disorders, fevers, constipation, obesity, and general malnourishment in infants and adults.

The recipes have been most carefully worked

out under authoritative auspices, and with each recipe is given a quantitive analysis of carbohydrates, fat, protein and calory value.

The diabetic section of the book is a most valuable contribution to advanced dietetic practice, with or without the insulin treatment. Another important chapter is the report of T. B. Downey, Ph.D., Fellow at Mellon Institute (Pittsburgh), on the value of pure, unflavored gelatine as a protective colloid in the modification of milk in infant feeding, which is no way changes prescribed formulas. Dr. Downey has determined, by standard feeding tests, that the addition of 1% of gelatine to a quart of milk, increases the yield of nourishment by about 23%.

Furthermore, these feeding tests determined that the protective colloidal action of the gelatine was highly efficacious in aiding the complete digestion and resulting assimilation of other basic foods of the vegetable, fruit, meat and fish families.

A most important feature of this book is the simple and complete directions for the preparation of these dishes, without which a prescribed diet so often fails despite the care and caution of the physician.

The book will be mailed, upon request—postpaid and free of charge—by the Charles B. Knox Gelatine Company, Johnstown, N. Y., to any physician or dietician who requests it.

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## ASSOCIATION NEWS

President Vinson has called a conjoined meeting of the Executive, Legislative, and Scientific Committees, and all the district Councillors, on March 26th, at Daytona.

The purpose of this meeting is to promote efficient functioning and coordination of the committees and councillors, also to study the medical conditions in the state, and discuss the ways and means of meeting them. This will afford the committees an opportunity to make fuller and more intelligent reports at the next state meeting.

In calling this preconvention meeting of committees and councillors, President Vinson has taken a step in making the next meeting the most successful we have had, and ultimately in the best interest of the profession in the state. It is to be hoped that every committee member and councillor will attend.

Patronize Our Advertisers

## ANNOUNCEMENT OF SCIENTIFIC PROGRAM COMMITTEE

The Committee on Scientific Work of the Florida Medical Association wish to make the following announcement relative to the program for the next annual meeting.

Twenty-three papers will constitute the Scientific Program. Those desiring to read papers will communicate with a member of the committee, giving title and abstract of paper. All applications should be in the hands of the committee by March 15th. It is the desire of the committee to have all parts of the state represented and for the papers to cover as many different subjects as possible.

Attention is invited to Chapter 3, Section 4 of the Constitution, which was amended to read as follows at our last annual meeting:

"No address or paper before the Association, except those of the President and orators, shall occupy more than twenty minutes in its delivery, and no member shall speak longer than five minutes, nor more than once on any subject. Provided, that all papers be read before the component County Medical Society of which the essayist is a member."

Amended to read: "No address or paper before the Association, except those of the President and orators, shall occupy more than fifteen minutes in its delivery, and no member shall speak longer than five minutes, nor more than once on any one subject."

Members are urged to forward applications for place on program as soon as possible, to any member of the Scientific Committee, preferably to that member from his section of the state.

H. Mason Smith, *Chairman,*
Stovall Bldg., Tampa, Fla.

Shaler A. Richardson,
11 West Adams St., Jacksonville, Fla.

John A. Simmon,
Miami, Fla.

# Fifty-Second Annual Meeting

# ST. PETERSBURG

# 1925

*Don't forget the Sunshine City*

**The Journal of the Florida Medical Association**

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## THE ST. PETERSBURG PROGRAM

The Committee on Scientific Program has sent an announcement to the membership of the State Medical Association stating the principles on which the program for the St. Petersburg meeting will be built. The committee invites applications for places on the program, which applications are to be passed on at a final meeting of the committee to be held March 26th.

The program this year, according to this announcement, is to consist of twenty-three papers besides the paper from the invited guest. This with the discussions will occupy the two days the Association is in session.

It is to be hoped that the Committee will introduce an innovation this year by arranging an informal program for the evening before the Association convenes. Many physicians arrive at the meeting place the evening before the opening, and have nowhere to go. The annual meeting of the railroad surgeons is held the day previous to the State Medical Association. This will cause many physicians to be in the city, and some kind of a medical program should be arranged.

This is offered merely as a suggestion which the Committee can follow if feasible, but year after year we have felt the evening before the formal convening should be utilized.

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## THE SUPRARENAL PRINCIPLE

When the active principle of suprarenal glands was isolated for the first time—by Takamine in 1900—it was named Adrenalin, from the fact that the medullary portion of the suprarenal gland is properly known as the adrenal body. The history of suprarenal therapy has been written for the most part from experience with Adrenalin, and the majority of writers on the subject have given the product its proper name as designated by its discoverer wellnigh a quarter of a century ago.

There is now an Adrenalin family—in addition to the liquid in vials and ampoules: an ointment, a suppository, and an inhalant, all bearing the name and all depending upon the presence of Adrenalin in the formula for their efficacy.

The manufacturers, Parke, Davis & Co., announce that they have a booklet containing practical information on all the Adrenalin products, which they will be glad to send to any inquiring physician.